Six Essays

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What I Should Have Known at the Science Fair

If food is analogous to sex, as we sexually frustrated gourmands would of course have it, then *Capsicums* are the high-heeled, whip-toting dominatrices to whom some rare personalities become helplessly addicted. *Capsicum* is the genus of peppers, the fruits which sting and burn when eaten. I've enjoyed that same sensation as long as I can remember – spicy Mexican dinners after preschool and daycare in Houston, Texas – and even farther back according to my mother, who says she would mix diced jalapenos into my baby food. How she discovered that her babbling infant son actually *liked* hot peppers, without a cruelly conceived experiment, I don't know.

The consensus among biologists and horticulturalists is that peppers' irritant properties evolved as an eccentric defense mechanism, in these fruits which otherwise would be eye-catching, sweet, and nutritionally wholesome. Clearly, for them to survive in substantial numbers there had to be a catch.

And so there is. *Capsicums* speak "deterrence" in two of the animal kingdom's universal languages: bright colors and excruciating pain. A Cayenne's flaming red, or the neon orange of a Habanero, says very clearly "Don't eat me. You'll be sorry."[1] If an unwary herbivore fails to heed this warning, the resultant agony says, and here I'm paraphrasing, "I warned you, but did you listen? Noooo. It's just like your mother says, you never listen. Now look where it's gotten you . . ." This has proven to be an effective means of discouraging predators, with one notable exception.

[1] Bright colors sometimes mean "Look at me! I am sexually receptive and desirable!" too, such as with birds' plumage or estrous baboons. This would be a recipe for disaster if the difference between the two cases wasn't painfully obvious, even to birds and baboons.

Just as most animals have a healthy, instinctual fear of fire, but humans are mesmerized by it, some of us have developed a taste for a nutritional experience from which other species must feel glad to escape with their lives.[2] Luckily for the peppers, humans have a way of developing symbiotic relationships with food species through agriculture. Despite being native only to the Americas, *Capsicums* have become staples in culinary cultures as far from their New World origins as India and China.

The summer I turned six years old, my mother graduated medical school and took her residency in North Carolina. There is only one word appropriate to the "Soul Food" and "Country Cookin'" one encounters in the South: bland. Hearty, yes, even satisfying, but relentlessly, dispiritingly bland.[3] For six long years, even a modest *Capsicum* fix was precisely as rare as an unamericanized hole-in-the-wall Mexican joint – always an evanescent pleasure, doomed in Winston-Salem to a swift and prosaic failure following a public consensus that it was "just too hot."

When we moved again, this time to Alabama, and things predictably failed to get better quickly, I took matters into my own hands. With the topic deadline for my seventh-grade science fair project looming, and hard up for inspiration, I saw a plausible excuse to create an all-you-can-eat *Capsicum* smorgasbord, and fully comp'ed to boot, "school expenses" being a reliable dodge in those days.

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[2] I think humans' behavior with respect to peppers proves that the difference between man and other animals is not our use of tools. Chimpanzees and sea otters use tools, anyway. Nor is it our grasp of language, since Gorillas can be taught to speak in sign language. The difference is that we use our gift of language to talk one another into shit that is so obviously stupid that any otters in witness could only slap their foreheads with webbed feet in disbelief.

[3] Exception: Louisiana. Sucking the innards out of a crawfish boiled with too much cayenne powder is a memory I look to for strength in my darkest moods.

I spent the next several weeks in a cloud of hot pepper fumes, researching and sourcing obscure species, blending and diluting eye-watering and brightly colored mixtures, and of course tasting, hesitantly at first but with steadily increasing confidence. The smell (which I found delightful, but others, apparently, did not) followed me to school. Our cats wouldn't come near my laboratory,[4] and my parents and brother avoided the area as best they could. Every time I forgot not to touch my eyes, I had to sprint to the sink and rub soap in them to ease the pain.[5] Even so, my father had to drive me several times to the exotic-foods market to replace experimental samples I had absentmindedly eaten whole.[6]

When the Science Fair finally arrived, "Taste the Burn: The pH of Peppers" cut a bloody swath through the competition, capturing first prize at school, district, and regional levels, before burning out at the state championships, where I was backed into a trifold presentation-board corner of my own making by a merciless judge and forced to admit that no, in fact I hadn't the first clue about high-pressure liquid chromatography, except that it was "messy." C'est la vie. There was always the Science Olympiad, and next year's project, a computer simulation of several practical schemes to destabilize the orbit of the moon and wreck it into the Earth's surface, would draw many fewer confrontational questions.

I walked away with $35 from the Institute of Electrical and Electronics Engineers in my pocket, the hottest little nerd girl in the seventh grade on my arm, and a strange

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[4] the kitchen

[5] There is no plausible reason I can determine why soap should have helped. It may be as simple as having a different, lesser pain to distract me from the pepper burn, and it is certainly not out of the question that the benefit was entirely in my head.

[6] In general, this is a very bad habit when performing organic chemistry experiments.

new craving in the back of my throat, which didn't, I was concerned to discover myself thinking, seem to hurt quite enough.

The "scientific conclusion" of that project was that there exists a statistical correspondence between the pH, or acidity, of various species of peppers, and their "hotness" as measured in standard Scoville Heat Units, suggesting that eating a hot pepper is roughly equivalent to pouring weak acid on your tongue. Subsequent reading (which I should have done in the first place) revealed that this is not in fact the case. Had I at that young stage the mature relationship to peppers I do now, I would have doubted my result simply for the malicious light it cast on these delectable fruit. Acid burn? How crude. No, chilis are our friends. The real source of the pain is elegant in the extreme of beauty.

The Scoville Heat Index is a logarithmic scale meant to give a rough sense of the comparative agony different peppers induce. As much fun as it would have been to conduct the study, it is *not* based on subjective feedback from unwitting volunteers. It is a measurement in parts per million of a chemical, Capsaicin, in the pepper. Capsaicin was named, of course, for the only genus of organisms in which it can be found in any substantial concentration. Once it was established (by better scientists than I) that the concentration of Capsaicin determines how much a chili hurts,[7] they set about discovering how the stuff works. As it turns out, my own quaint hypothesis couldn't have been more wrong. Capsaicin is chemically very stable, exiting the body undigested just as it entered, and often with the same ill temper. Nor does it actually *burn* in any strict

[7] A dead giveaway is that the Bell pepper, the only species of *Capsicum* that does not hurt at all, is also the only one that lacks the dominant gene for capsaicin production.

technical sense of the word. The pepper juices are room temperature in your hand, and anything volatile enough to heat up *that* much at a bite wouldn't last long in a natural world where "bioequilibrium" has been the motto since the debut of the blue-green algae.

So why does it hurt? By a coincidence of geometry, the capsaicin molecule fits neatly into every pain receptor in your body. There it alights near a chemical gate in a cell membrane which regulates admission of positive ions. These ions, once inside the gate, are what trigger the pain response. A capsaicin molecule drifting nearby effectively raises the gate, waving ions through willy-nilly like a mutinous nightclub bouncer. Eventually the Capsaicin molecule drifts away, and the gate simply resumes normal operation.

A few extra protons, temporarily on the wrong side of a cell wall. That's all. Capsaicin hurts not because of any dynamic property, anything it does. It hurts simply because of what it *is*. Capsaicin is pure pain, pure because it does not achieve its effect by the usual destructive behaviors, as do sunburn or flesh-eating bacteria, for example. It is pain without injury, and that amounts to a little-known (and less-appreciated) license to explore the nature and limits of pain without fear of consequence.

In this respect, eating a Habanero (by far the hottest pepper: ~ 450, 000 Scovilles) is unique among macho stunts. It is harmless, demonstrating all the courage and fortitude of, say, getting a tattoo, but without the danger of permanent association to a typographical error. The pain comes and, though it may seem an eternity, eventually goes, leaving no trace of itself on your body except a mild endorphin rush. It is ethereal, almost spiritual agony.

The endorphins are of particular interest, because they probably have a lot to do with why I, personally, am such an inveterate chilihead. Endorphin is a chemical produced in the brain, believed to cause feelings of satisfaction and pleasure. Most of the "natural highs," such as the radiant après-sex glow and runners' euphorias, are associated with increased levels of endorphin in the brain. It is also manufactured when a body is in a great deal of physical pain, such as that inevitably succeeding a good bite of *Capsicum*. It still hurts like hell, but for the connoisseur, that agony can be attended by a wonderful, irrational glee.

If you crush a *Capsicum* and immerse the mash in an appropriate organic solvent (Hexane works), then after a while drain off the liquid and boil it to evaporate the solvent, you will have distilled yourself a small sample of *Oleoresin Capsicum*, the oil in which the pepper's capsaicin is concentrated. Portable, mixable Hellfire[8]. The possibilities are endless.

The Scoville rating of oleoresin varies depending on the peppers it was extracted from, but the weakest oleoresins have ratings comparable to the most vicious raw peppers.[9] This means that if you choose your peppers and dilutions carefully, you can create an extract customized to suit (or exceed) any taste (or tolerance). In general, the

[8] An organic solvent is necessary because neither capsaicin nor oleoresin capsicum dissolves in water. This is why your reflexive dive for the icewater didn't help the last time you ventured out of your depth for the Pad Thai or Mongolian barbecue. In fact, all a mouthful of water does is rinse the capsaicin around, actually *spreading* the sting while doing nothing to diminish it. Sucker.

[9] In an absolute sense, oleoresin is still rather dilute with respect to Capsaicin. A taste, or even a smell, of pure Capsaicin (16 million Scovilles) is, simply put, inconceivable. Chemists who work with the dry, crystalline form do so in zero-exposure hazmat suits, breathing air from outside the laboratory through a hose. You could not determine, from a casual examination of the safety precautions, whether they were studying Capsaicin or Ebolavirus.

only limitation is how hot you can stand it, though for some applications, the concentration will be bounded below by how hot somebody else *can't* stand it.

If you didn't know already, it should come as no surprise by now that Capsaicin is the active ingredient in pepper spray, still the only effective and 100% nonlethal weapon available outside of a Star Trek rerun. As a result of pepper spray's remarkable safety record, police oftentimes will have developed an interesting relationship to the stuff. Since the pain from capsaicin is, in effect, a biochemical sleight-of-hand, attended by no real risk of physical damage, officers in many districts are not required to file reports vindicating their use of force when they pepper-spray a suspect. Depending how much a cop hates paperwork (and ask yourself why they would hate it any less than you), this means that he or she will be strongly inclined, before so much as grabbing you by the lapel, to pour so much capsaicin in your face that you'll want to claw out your own eyeballs.

By far the most common use for oleoresin, though, is as an additive to hot sauces with names like Mad Dog Inferno, Dead on Arrival, Asses of Fire, and Possible Side Effects. Your milder sauces like Tabasco, sold to the general public, are made with undistilled pepper juice and often have comic-book style "WHAMMO!" blurbs on the label that say things like "Warning: HOT!" Asses of Fire, et al, have disclaimers printed in small type on the back of the label, which generally read something like the following: "Asses of Fire is meant for use as an additive only. Do not consume Asses of Fire directly.[10] Not for use by individuals suffering from asthma, arrhythmia, or any other cardiac or pulmonary conditions. Not for use by pregnant or nursing mothers, the elderly, children under the age of eight, or individuals with a history of mental illness. Do not

[10] Yeah, right.

drive or operate machinery while under the influence of Asses of Fire. Asses of Fire Unlimited, L.L.C., is not responsible . . .” and so on.

My own favorite hot sauces are, in no particular order, Dave’s Insanity, Screaming Sphincter, Final Answer, and Yucatan Sunshine. Dave’s is what I keep in the ‘fridge, because it represents the best compromise between potency and usability. It is hot enough that your friends will all wait for somebody else to take the first bite of your cooking, but not quite so hot that they’ll never speak to you again, provided you use it with discretion. Dave’s is a pleasant curiosity among oleoresin-based sauces, in that it possesses a carefully crafted and genuinely appealing taste. It even comes in several varieties, like Dave’s Seafood Insanity and Dave’s Temporary Insanity, intended for use in different dishes.

Other sauces do not concern themselves with the pretenses of cuisine. Final Answer, for example, is nothing more than a chemical catalyst for the reaction that turns Capsaicin into verbal obscenities. If, as the argument goes, you can distinguish a “taste” over the anguished shrieks of your sensitive soft tissues and a mob-riot of mucosal membranes, whatever you just ate wasn’t really all that hot. If you are an essentially healthy person in possession of all your digits and limbs, Final Answer probably hurts more than anything you’ve ever experienced. At 1.5 *million* Scovilles, the only point of comparison is a pepper-spray device designed to subdue angry grizzly bears. For this reason, it is illegal in some states to store Final Solution under pressure, as it would violate pertinent regulations concerning civilian-use capsaicin weapons.[11]

[11] Police and military have access to higher concentrations than civilians. With the federal assault-weapons ban recently expired, it is of some comfort to know that law enforcement can still rely on superior firepower when forced to intervene in a food fight.

Take one part *Oleoresin Capsicum*. Add propellant, and you've got an effective means of physical torture. You can store it on a shelf in the cellar next to the testicle clamps and the car battery. Add tomato juice and a dash of balsamic vinegar instead, and you've got the secret ingredient in a blue-ribbon chili recipe.

An indulgent afternoon spent in contemplation of *Capsicums* meanders through cuisine, cartography, chemistry, and eventuates in a contradiction. Of course, anything at all examined closely enough will yield its own unique intellectual pleasures. We live in a complex and astonishing world. Rocks have history. Cotton socks have ethics. Honeybees dance in six dimensions. Anyone with a cultivated and omnivorous curiosity can always find food for thought in easy abundance. But even amidst this happy glut, Capsaicin remains a delicacy. Photosynthesis or Vitamin C could provide conceptual vehicles for equally diverting lay excursions through molecular or evolutionary biology, but they would be unlikely to lead you thereby to such a compelling, human conundrum. Even if you could distill a worthwhile extract of philosophy, you could not then consummate the inquiry with tongue and teeth, and sift its meaning in your own giddy tears.

The apparent paradox of Capsaicin is not essential, chemically, however. For other animals, no contradiction exists. If you mix your backyard birdseed with oleoresin just once, the neighborhood varmints will all bugger off and forage elsewhere. There is no eccentric minority of squirrels who insist that Capsaicin-doped seed is an acquired taste, and dare one another to eat bigger and bigger mouthfuls, or who compose ponderous essays about the curious attractions of the poisoned birdfeeders. Pleasure and

pain are exclusive for a rodent.[12] It requires no more than a casual glance at the artistry and mischief displayed on any grocer's hot sauce shelf to see that for humans, some at least, this is emphatically not the case. It might seem needless and masochistic to squirrels, otters, and like-minded people, but if an intellectual is someone who can contain two contradictory thoughts in her brain at once, and a gourmand is one who can savor each of a dozen flavors in a hot curry, perhaps a human is an animal with room enough in its perception to accommodate agony and joy in a single bite.

[12]The birds will stay, but the addition of oleoresin makes no difference to them, since their beaks lack the particular variety of cells Capsaicin attacks.

The Great American Fencing Essay

I consider my opponent's body. Like me, he could have been a swimmer or a runner, and instead of this psychological warfare bullshit, we could be wishing each other luck, side-by-side in the blocks. You see, in respectable one-man sports,[13] one competes in order to motivate an individual performance, and to physically obstruct an opponent's would, in point of fact, be cheating. The absence of fencers' mutual understanding – that we're both there to frustrate, defeat, and if at all possible, to humiliate the other – could afford us a pleasant and reassuring degree of civility, even camaraderie.

But I know that he and I could never have been satisfied. We are fencers because victory for us is incomplete if it is not won at the dear expense to another of unambiguous defeat. We are both here indentured to our own sadism and vanity. The comic tragedy of this contest is that neither of us deserves the satisfaction of victory. But we're plugged in and *en garde*. That means that one of us has to lose, and Coach says it damn sure better not be me. This is enough to satisfy my lazy conscience.

There is of course a powerful competitive streak common to all athletes, but there will always be something different about what drives a fencer. You can hear it when he takes a close match or even a hard-fought touch. He screams, but the sound is unrecognizable as one of victory or success. It is inarticulate, feral noise, akin to cries of terror, ecstasy, agony, rage, expressing something in the individual which long predates their command of language.

[13] Team sports are right out. Fencing attracts hardassed loners in the first place and does nothing to develop interpersonal skills. My squad's weekend soccer match resembles a pickup game of Afghan Buzkashi.

The first touch is mine, and I roar like a tiger over its prey.

Once upon a time, the primitive aggression which today passes for a fencer's "competitive instinct" was not regarded with the same indulgence it enjoys today. At various locations and times throughout European history, fencing schools were outlawed for encouraging and abetting violence. Fencing masters were held in the same low regard as actors – individuals with some education but no productive trade. Fencing itself was a criminal's talent, like picking locks or sleight of hand.

The reform of fencing's reputation began in the sixteenth century, via adoption into the standard curricula for a gentleman's education. It began as a practical matter of self-defense, but the instinct for leisure is strong among the aristocracy, and before long it was made into a whimsical game. Here lie the origins of swordplay as sport, for which I will be forever grateful. However, this was also the beginning of every aggravating, antiquated stereotype fencers have to contend with today. And unfortunately, the popular conception of fencing as a dandy's sport, most suitable for pale, nearsighted intellectuals with exaggerated manners and no heart for a real confrontation,[14] has proven so ferociously persistent only because until less than fifty years ago, it was entirely accurate.

Fencing continued in this bloodless vein for almost four hundred years. It had become an institution of privilege and wealth, practiced by those who knew nothing of necessity, and therefore nothing of innovation. Eventual change would only come as the consequence of an attempted global revolution.

[14] As a pale, nearsighted intellectual myself, this bothers me more than it does some other fencers.

Athletics was one battleground in the Cold War struggle for cultural domination, and fencing has been an Olympic sport since the first modern games in 1896. For a Communist bloc with no regard for genteel Western tradition, fencing medals were easy pickings. By the 1970s, developments in the sport like electronic scoring and nearly foolproof safety equipment – developments of which Europeans had, out of simple inertia, failed to take full advantage – allowed the USSR and teams from its satellite states to practice a faster, more athletic, completely dominant game. Russia, Georgia, East Germany, and the Ukraine owned the Olympics and world championships well into the late eighties.

The traditional fencing community was, of course, appalled. Eventually they would tire of losing and get with the (new) program, but for a time there was talk of how the barbarian Slavs were ruining a venerated and centuries-old pastime. The Reds had consciously sacrificed (to a certain degree) strategy and precision – at the time considered the sport's highest virtues – for a renewed emphasis on strength and the fighting spirit. Many saw this as a brawling regression unfit for gentlemen.

To my own coach, a veteran of the Soviet *avant-garde*, fencers are not gentlemen. They are tigers and wolves, *volka*, and fencing is the act of predation which sustains them. "Feet feed a fencer like feet feed a wolf." Chivalric code becomes Law of the Jungle.

This divide can be observed even today, in the perpetual campaign by the sport's vocal minority to alter the rules and to reengineer or abolish the electronics, in order to encourage slower and more deliberative play. To most everybody else they are sore losers. To themselves, they are keepers of the faith, defenders of civilization.

It all makes a certain sense when you consider that fencing is one of very few modern games with it origins in human bloodsport. Once upon a time, the fencer's way was "live by the sword, die by the sword." After the Renaissance gentrification, fencers no longer had to worry that they would die for their passion, but neither were they living for it, not in the exhilarated sense that once inspired some few to accept the bargain "as is." This is what modern apparatus and the Russian Revolution have given back to us. Even though we are now safer, thanks to space-age polymers and alloys, than the European dandies ever were, the renewed pace and exertion of the bout make it easy to forget, momentarily, that the blades are harmless and that we're wearing Kevlar and ballistic nylon. In that moment of forgetting, I can begin to fight as though my life depended on it. This is why I fence. In a slower game one might never forget.

I know, however, that in some respects I owe the opportunity to forget to the stuffed shirts and shrinking violets. They've outlived their usefulness by now, but if their intellectual forefathers had never appropriated a thieves' dispute for the entertainment of respectable classes, fencing would have disappeared with the crucifix and witch-burning as one more anachronistic barbarity.

They practiced a soulless imitation, to be sure, but somehow the real game, of combat and killer instinct, never died. It was passed obliviously from master to student, finding expression in the occasional honor-duel, for four centuries. They carried it hidden within their bodies until my coach, and that first modern generation of real fighters, cut it from them, to feed to the next litter of wolves.

Way Leads Onto Way

My father subscribes to a theory, that most or all of a person's tastes, particularly their taste in music, are writ in stone by age eighteen. He first explained it to me driving through the Smoky Mountains on a two-man road trip to the east coast. Radio is hit-and-miss in those parts, so we were left more or less to our own devices for diversion. We had CDs, but Dad and I like to talk.

“You imprint on the music you hear in high school," he told me, "then you quit looking for new music. I know I did.” This, based on the compelling evidence that, for Dad's money, “Never Been to Spain,” by Three Dog Night (playing on the one frequency miraculously penetrating the mountains) never, never gets old.

It was Spring of 2003, nearing the end of my Freshman year at Ohio State. I was eighteen years old, so according to Dad's theory, I should have been surfing in vain for some late-nineties dance track or dilute radio-edit rap, or at least protesting the dated selection. I was singing along instead, eyes closed with my seat back all the way. Digging it.

"Then why do I listen to your high school music?"

"You never went to high school for yourself." Touché. I don't like to concede the last word, especially to Dad, but I left it at that to join the refrain.

“Never Been to Spain” is one of my favorite songs, about the mystique of places you've never been and things you haven't experienced. That's an important subject when you might be the only high school dropout in your university class. From the first day you move in, all your roommates and classmates, from parts disparate as Utah, Jersey,

LA, and Oregon, with nothing else in common, relate effortlessly to one another through “the high school experience” - the shared rituals of American adolescence - rituals and rites of passage you politely and self-righteously declined. So you spend your freshman year listening to your peers compare prom stories, graduation stories, recounting how they survived the standard curriculum and adapted to essentially similar school cultures. You have your own stories of adaptation and survival - everybody does - but yours are not relevant to your new friends' experiences, nor will you have any that are, until such time as you've all built new lives and identities around “the college experience.”

Don't get me wrong. I got an education and a damn good one at that. But high school's not really about the education is it? I know because I know what difference it makes. When I tell people I dropped out of school after eighth grade, they don't ask “but however did you learn history and calculus and the myriad intellectual disciplines which prepare you for study at an accredited four-year institution of higher learning?” They ask, “but don't you feel like you missed out on proms and stuff?”

The honest answer is I probably would have despised proms. Ceremony in general turns my stomach, I can't dance, I don't like the music they'd play anyway, and I'll never be comfortable in a tie, much less a tuxedo.

I can't be certain, though, because I've never been to a prom, and that doubt is enough to make me wonder how small an inconvenience it all might have really been, compared to the subtle alienation I came to regard as the ultimate price of four years' freedom in the prime of youth.

As for how I learned history and calculus, I studied - hard - on my own and with my parents, in addition to some part-time classwork at the University of Cincinnati. I don't like to say I was “homeschooled,” however, because the term connotes a certain ideological motivation for doing things differently. In my case the decision was strictly opportunistic, and the better opportunities lay off the beaten path. I'll happily use “dropout,” partly because the connotations are so far from the objective truth of the matter that it possesses a comfortable irony, and partly as a preemption of “God gave us high schools for a reason” types who would make it an epithet. I'm touchy about secondary-education language the way transsexuals are touchy about pronouns.

Dad and I spent the night in a motel a couple hours outside our destination - a Baptist church in Columbia, South Carolina. We rose early the next morning, cleaned up, unpacked our suit-bags, dressed, and threw our jackets over the back seat of my car to finish the drive. We arrived in the church parking lot right on time, told each other our ties looked fine, and headed inside.

I met my best friend Andrew in third grade, at a private school in North Carolina. Nowadays, he is just over six feet tall and has his mother's sharp nose and chin. He is extremely fit, having wrestled all four years in high school, and kept up with conditioning since then. He is the only person to defeat my father at arm wrestling in my lifetime, though the decision of the match has been contested. He dresses plainly but well, without much regard to brands or labels. Depending on how he styles his hair, he resembles either a marine or a young, untenured professor of humanities.

The summer after we graduated fifth grade, Andrew's mother Beth married an ophthalmologist named Rich and all three moved to South Carolina, where Andrew remained in the private school pipeline at Hammond, an expensive prep school in Columbia. That same summer, my own mother took a job at a hospital in Alabama. A month after I started fifth grade at a public school in Huntsville, I was leapfrogged directly to the seventh, and so graduated junior high a year ahead of Andrew. I took the standard term of four years for “high school,” and began my freshman year at Ohio State while Andrew was enjoying his tour as a senior at Hammond.

My greatest reservation about quitting school was that I might lose touch with Andrew. Ever since North Carolina, our history together has only been episodic, limited to whatever mischief and philosophy we could manage in a couple long weekends each year. After moving apart, I was concerned that if we were unable to share the daily grind, such as it is in primary school, we would drift apart. That anxiety only intensified when I advanced ahead of him in school, and then again when I dropped out altogether. At every crossroads, my path seemed to diverge a little farther from his and that of everyone I knew. As I found that I had progressively less and less to talk about with old friends, I worried that Andrew would become one more of my peers estranged by a gradual erosion of common ground.

So it was that I found myself at Andrew's high school graduation the following spring, at a Baptist church in Columbia, South Carolina, wondering if high school could come between me and him, also.

When we returned to Andrew's house after the ceremony, he and I posed together in the driveway for a photograph. It was a new installment in the “Feynman-Heisman” series. Andrew leaned forward, clutching an imaginary football to his chest and thrusting his free arm forward to shove off imaginary tackles. Where the tackles should have been, I stood with erect posture, legs crossed casually at the shins. My left arm was tucked under my right elbow, and I held my chin as I stared contemplatively into space. Andrew is Heisman. I am Feynman. There are a lot of photos of us posed this way, beginning in third grade, when Andrew played peewee football and I spent my free time reading science fiction novels. The pose captures the idiosyncrasy of our friendship perfectly. We took one at the premier of our fourth grade play and one at our elementary school graduation. We'll take one at my college graduation, and then at his. Should disaster befall one or both of us, we'll probably take a couple at our respective weddings.

Once inside, Dad, Rich, Beth, and I waited in the Kitchen for Andrew to change out of his robes. Dad chose the moment to get something off his chest.

“Do you see what you missed? Do you wish you'd had a graduation now?” It was the preamble to an argument he and I had fought many times. I had refused, in spite of my parents' pleas, to participate in a “graduation ceremony,” before leaving for college. At the time I believed, on the strength of purely hypothetical argument, that graduations must suffer from the same conceits and petty vanities as proms. What's more, the graduations that homeschool families staged were farcical potluck imitations of real high school ceremonies. My parents very graciously capitulated, surmising, I suppose, that a coerced commencement was the wrong way to send me off to college.

But a year later it still rankled Dad, and here before Andrew's beaming mother and stepfather I would be forced to grant the solemnity of the occasion. I wasn't going to make it that easy for him, though.

“I didn't need it.”

“It's not for you! Andrew's whole family is here! He got a diploma! They all saw it! How do we know you graduated?”

“My graduation occurred just as it should have,” I said slowly, “sliently in the night, like a quiet death of old age.” I really do say things like that, if I have enough time to think of them. That one I'd been sitting on for almost six months. It turned out to be a real conversation killer.

Once Andrew reemerged in his casual clothes, the remainder of the afternoon became an exercise in: patience (small-talking his relatives in the backyard), idleness (killing time on the Xbox), and discipline (keeping my eyes off his stepsisters). When night finally fell and all our parents and relatives were talking in the den, Andrew and I snuck into the kitchen with a travel cooler, kidnapped a dozen Budweisers, then slid coolly out the back door to Andrew's car.

The first “party” was a blind, a polite fiction for parents' peace of mind, merely a public rendezvous where carloads of graduates were individually rerouted to the real party, at an isolated lakehouse outside the city. *en route*, I considered that even though I was going essentially as Andrew's designated driver, the night could hold possibilities for me, too, if I was attentive.

"There are gonna be some scandalous hookups tonight," Andrew told me. And what would be more scandalous, I asked myself, than the prom queen or a well-regarded cheerleader indulging in a wild one-night stand with “Andrew's friend from Ohio,” to whom she'd only that night been introduced?

But even aside from all that, this was my opportunity to see what everybody was talking about. It wasn't homecoming or prom night, but I heard about graduation parties, too. “One night, after my best friend's graduation” would be my in, to conversations in which I had previously resigned myself to spectatorship. My goal for the night, then, was to keep my eyes and ears open, and accumulate as many stories as possible to take back to college, where I would wear them like camouflage, zebra stripes to join the herd.

Andrew pulled off the interstate onto a forgotten frontage road, and stopped in front of the gate to an unpaved private accessway. Our source at the first party had told us that as soon as everybody invited was accounted for, the gate would be shut and locked as a precaution, to prevent any revelers from driving off until the next afternoon, by which time everybody hopefully would have had a chance to sober up. It was going to be that kind of party. Andrew wanted to be home before our parents woke up in the morning, so he parked on the shoulder outside the gate and announced that we'd walk the rest of the way.

The trail struggled up a steep grade into a thick forest of palmetto and oak. The road was long enough that we lost sight, and then sense, of the gated entrance long before we ever saw the lights from the house. The dense canopy admitted so little starlight that we had to navigate at times by following the edges of tire tracks with our shoes.

Eventually, the path let out into a moonlit clearing right at the top of the hill, beside a collection of jeeps and SUVs parked behind the house. There was a huge porch, half of it covered, facing the lake, and it was already crowded with drinking and dancing. The shore was a few minutes' stroll from the porch down a dirt hillside. A wood pier ending in a large platform reached out over the water. As we climbed the porch steps, Andrew exchanged greetings and congratulations with his classmates and began to point out to me who was who. Not long after we arrived, he introduced me to Staci.

Only by a generous definition of “date” could it be said that I ever did so, even casually, during my nominal high school years, so I followed Andrew's dating stories with vicarious fascination. Staci was Andrew's first serious girlfriend. They were together for nine months ending near the middle of their senior year, at which point they had a ferocious falling out. Months afterwards, Andrew still didn't like to talk about it, but when I could coax some details from him, he would recite laundry lists of rejections, concessions, humiliations, reprisals - both on his part and Staci's. My decision to pursue an alternative education was also a tacit rejection of the high school social scene, as I understood it, so I found some vindication in Andrew's heartbreak and regrets. High school, they convinced me, was where people learned to take offense, and how to get under one another's skin. Chemistry I can read in a book. Cruelty has to be taught, and I decided that was an education I wouldn't consent to for a year of prom nights.

Making my further introductions inside, I took special notice of one fellow - tall, skinny, awkward, always on the fringe of one conversation or another, listening, rarely participating. I got the sense that he maybe didn't quite belong, that he was a bit of a dork,

invited, perhaps, only because one of the popular kids was inexplicably find of him. And I could not deny, no matter how I tried, the uncanny resemblance to myself. We shared an archetype, he and I, and I quickly convinced myself that I had found in him an image, of what might have been. So when he approached me, I introduced myself with the confidence and enthusiasm that come from recognizing a kindred spirit.

He was clutching a small black bottle of sake and had pinned his slovenly blonde hair back with a wide headband, emblazoned with Japanese Kanji. I translated them mentally, but can't now recall exactly what they said. I do recall being disappointed to find that they were sentimental and perfectly earnest. Gaijin sporting symbols they don't understand was a fashion whose comic potential was never realized.

“So what's college like?” His first question was predictable, but tragic. I had no point of reference. I only knew college. What's it like having a belly button?

“I . . . don't really know how to say. I'm sure you'll find out. What was high school like?” We stared at each other, blinking, several moments more, in order to make certain, before we never spoke again, that we were in fact utterly useless to one another. The night was off to a great start.

I wandered disappointedly back onto the outside porch. Andrew was sitting on a bench against the railing, pleading with the girl next to him to pull up her shirt and bra. I walked over and perched myself on the railing behind him.

“Come on. Please. You know I broke up with Staci. It's been two months since I saw a boob. Just a little flash.” Grinning, he pantomimed pulling the collar of his shirt down below his nipple. Andrew, as it turns out, is a drunk without dignity.

Eventually she caved. She heaved a sigh and set her drink on the floor. She looked to either side of her as though crossing a street, and quickly pulled her top up and back down.

"Satisfied?" she insisted, then walked away.

After she left, Andrew loudly announced that he was leaving the porch to relieve himself. There was a bathroom indoors not twenty feet away, but he did a crisp, military about-face and headed for the porch steps, towards the lake.

I don't know why it's so very, very satisfying to urinate outside when you're drunk, but I've been there, and it is, so I chose to bite my tongue and respect Andrew's decision. But as I watched him from the porch railing, stumbling towards the pier, I remembered something my mother once told me. “Alex,” she said, “most drowning victims are discovered with their fly open.” At the time this confused me. Curious turtles? A self-gratified last wish? Much of my mother's advice was similarly Delphic, so I had learned to just file it away until such time as its meaning would be revealed to me. Andrew was having trouble staying afloat on dry land. If he stumbled at the edge of the pier, it might be the last I saw of him. I hopped down off the railing and followed him. Staci intercepted me as I made my way across the porch.

“Where are you going?”

“I gotta piss, too.”

“There's a bathroom right inside, you know.”

“Whatever.”

By the time I caught up with him at the end of the pier, Andrew was at the edge relaxing his shoulders. He heard me creaking up the planks and turned his head to see who it was.

“What are you doing out here?” I'm your guardian angel, dude. I'm here to protect you.

“Same as you.” I stepped up beside him and unzipped my fly to take a leak.

“Having fun?” he asked.

“Yeah.” I laughed. “It's a good party.” I didn't really need to piss, so I finished quickly and zipped my fly. Andrew looked over at me.

“What, that's all?”

“I'm not drinking beer.”

“Why in the hell not?”

“So I can drive you home, remember?”

“Oh, yeah. That's a good idea.” He swiveled his hips, waving his stream around, and made a “woo-hoo” noise. Meditating quietly together in this manner, I experienced an unpleasant revelation. It was accompanied by the creeping, nauseous humiliation that always means I've made a stupid, absentminded, thoroughly avoidable mistake.

“Dude . . . I don't know how to drive a stick-shift.” Andrew took several seconds to sort through the implications: Alex can't drive a stick-shift. My car is a stick-shift. Alex can't drive my car. Yet, Alex is supposed to drive my car home after the party. A contradiction.

“Oh, man,” he said. “Okay. I'd better quit drinking.” He was still peeing, and from the sound of it wasn't about to stop, either. It had to be some kind of record. He was

going to permanently alter the lake's delicate chemical equilibrium. I imagined whole schools of fish floating to the surface dead. I began to doubt whether I actually would dive in after him.

"No," I told him, "it's too late for that. You enjoy yourself."

"Okay."

As Andrew (finally) concluded his business and I stood on the dark pier, frantically considering the imminent prospect of spending the next day sober amidst a general convalescence of moaning, vomiting graduates, I conceived what I hope to recall in my memoirs as my worst idea, ever.

"Look, I don't want to spend the night here," I said.

"Me neither," he concurred, "but what can we do about it?"

"Are you sober enough to teach me how to drive your car?"

We didn't stop at the house on our way back to the gate, but Staci caught sight of us from the porch and called out, "Now where are you going?" For a bitter ex, she took a lot of interest in Andrew's comings and goings.

"Andrew's going to teach me to drive a stick!" I hollered back.

"What! He's drunk!"

"I'm sober. I'll have the wheel."

"You just said you can't drive a stick!"

"Andrew knows how."

"He's drunk!"

“Yeah, but I'm sober.” Staci took a moment to reflect on the conversation, then enunciated loudly, as though for someone hard of either hearing or comprehension.

“You're both going to die!” Andrew and I laughed as we rejoined the dark road through the forest, passing form sight of the party, the house, the lake, and Staci. Andrew stopped to urinate on a tree.

The gate was now closed and locked, as proof against expeditious idiots. Idiot-proofing, however, is a reliably futile exercise. There's always a better idiot. And when Andrew and I put our heads together, we're the best. We climbed the fence. Andrew got over without spilling his beer, but a wood crossbeam gave under my weight, reducing about five feet of carefully erected fence to irregular firewood. Mercifully, we'd be long gone before my handiwork was discovered the next day. Besides, I thought as I brushed off the lose dirt, now we had an easy way back in.

We didn't both die, though I won't say we weren't flirting with disaster. It was grand fun. I suppose it could have been possible to conduct my lesson with a greater regard to safety, but Andrew had already etherized his own voices of doubt and reason, and I had just been called out by circumstance. I had something to prove and I drove like it.

Naturally, it was a chaotic experience. We defaulted to a pedagogic method of trial-and-error. Andrew told me how to avoid dangerous mistakes immediately after I made them. We overdrove the lights on the winding backroad, because (and how could it be helped?) I had to practice shifting into fifth gear, too. I had to decide for myself whether Andrew really meant “brake” or “clutch” - beer dissolves one into the other - and

I guessed wrong more than once. We were communicating, despite a cumulus fog of alcohol, inexperience, and night, via the penetrating rapport that occurs at frequencies of light or sound or quantum resonance, unknown to dogs or high-energy physicists, accessible only in tandem by best friends, best friends for life, sharing the same space, the same moment, the same thrill. We didn't both die. But if we had just then, I think we would have gone to our reward arm-in-arm without regret.

After about twenty minutes on the frontage road, and some practice with parking and reverse at a nearby gas station, Andrew announced that I had the knack, and that furthermore, I had been a thoroughly remarkable student. On the way back to the gate, we indulged in a little mutual admiration.

“You caught on really fast. I tried to teach Staci for months and she still never got the hang of it.”

“Well,” I smirked, “You know. Women drivers.” Andrew grinned conspiratorially, then belched.

“Okay, but still. You're a fast learner.”

“Perhaps, but it takes a good teacher.”

“We make a fuckin' awesome team!”

“We have a rapport.”

“ . . . Huh?”

As we emerged once again from the woods beside the house, there was applause form the porch. Now that Andrew and I were back safely, they wouldn't have to assay the drunken rescue expedition they were organizing.

“Hey, Staci!” Andrew shouted at the deck, loud enough for everyone to hear, “I just taught Alex to drive a stick in fifteen minutes!”

With our ride home secure, Andrew and I settled into the party in earnest. We split up for a while to mingle independently. Inside the house, I reminded myself that I wasn't drinking any of the partygoers' beer, in order to rationalize the ruthless pillage of their burrito take-out. Bean-and-cheese burritos with cheap beer is bad news anyway. I was saving them from themselves.

We met up again at length, and headed back down to the pier for some fresh air. The morning was reaching its coldest, sleepiest hours. The two of us sat facing the opposite bank with our legs stretched out in front of us. The air was wonderful on the water that far from the city, so as long as we had the pier to ourselves, we reclined in companionable silence, breathing.

In South Carolina it always smells like it's about to rain. Some indigenous chemistry of humidity and pollens tricks my primitive brain and maroons my consciousness on a mountain overlook in Alabama, watching a storm roll in on the valley below. That peak above the Tennessee River was where I took some of some of my first lessons as a free-range student, within view of the high school I was zoned for. My folks never bothered with the formalities of attendance waivers in Alabama, so I liked to imagine that somewhere in the ugly buildings below, a teacher was calling my name in

the rolls. Without moving from my rock, I would watch the students arrive in the morning, shuffle between buildings at each bell, and then flee the campus at the end of the day like bees being smoked from a hive, all the while telling myself that not a single one of them had it as good as I had it alone on my rock.

But sometime in the past year, I had realized that, just like a beehive, there was much more going on inside that school than I could see from without. The students weren't just going to class and football practice. They were constructing a collective consciousness. They were negotiating standards of exchange and the going rates for social contracts. They were learning a language of idiom that only a few hundred people would ever speak fluently. They were teaching each other to drive manual. And there I was at the lake, a wasp or a beetle, trying to poach a whole honeycomb in the last day before they abandoned the hive.

Before long we heard footsteps - one set, someone light - walking down the pier towards us. We didn't turn around, content to wait until they arrived to satisfy our curiosity. Something about that time of morning gives one patience, or else indifference.

It was Staci. She sat down on the bench and made intentionally awkward small talk until I got up and left, in spite of my reluctance to leave Andrew alone with her. From what I had gathered, she could unfurl her serpentine fangs and devour a human soul with little warning, but I decided Andrew was drunk enough to tell her off if it came to that.

Halfway up the hill, I saw that everybody in the house was gathered under the covered porch, all playing some sort of game. Once I was within earshot, I realized they were playing “Never Have I Ever,” the game where somebody proposes an outrageous or transgressive experience, and all the players who've “been there” take a swig of what they're drinking. In my capacity as Andrew's driver, I couldn't join them, so I decided to sit down on the ground where I was and tally my score mentally, instead.

Never have I ever shown up to first bell wasted. I never had a first bell, or a second or a fifth. I spent most days, and often two or three in a row, on a single subject. Not much point in getting drunk to sit down at a desk in my own bedroom, anyway.

Never have I ever smuggled answers into a test. No tests, and no grades, so no pressure to cheat.

Never have I ever surfed porn in the computer lab. There would have been only one suspect when my parents audited the browser history.

Never have I ever shit on the baseball diamond. Fucking jocks. No baseball diamond to shit on, but perhaps more essentially, no jocks to resent.

If I had gotten stumbling drunk and joined the game, I would have been stone sober by the time they moved on to spin-the-bottle. And what would I have brought to the game anyway? Never have I ever spent more than two months truant. Never have I ever illegally spelunked the steam tunnels beneath the UC campus. Never have I ever overstated my age by five years to get a date with a classmate.

I decided then that I don't like “Never Have I Ever.” I couldn't drink to their lives, and they'd never drink to mine.

Several hours later, I was sitting on the porch rail again, watching from the sidelines as the party dwindled to a slowly waning crescent. The kamikazes were all unconscious, scattered in the dirt beneath the porch as though they'd been kicked from a neat pile. The marathoners were now drinking to postpone hangover. No one could keep up with dance music or hip-hop anymore, so the stereo had gone back indoors. In place of the music, a guilty sense of imposition on the natural calm descended. The momentum was gone, or at least any motive force, and those who had not yet ground to a halt, overcome by internal resistance, were coasting towards a finite, inevitable point in the distance, where everyone knew they would at last come to rest.

I was watching this when one of the girls walked over and asked me where Andrew was. I gestured lazily with my head towards the pier.

“They're still talking?” She sounded concerned.

“I suppose they have a lot to talk about.”

“And how. Someone,” significant pause, “should go make sure they're not about to kill each other.” She dissappeared before I could ask if she happened to be busy.

In fact I had been keeping an eye on them for a while. I knew that what looked from the porch rail like civil reminiscences was almost certainly a quick-draw contest of recrimination and victimhood. I suppose they were trying to clear the air and move on, to reconcile the conviction that they are both kind, just people with the undeniable pain they caused each other. I wondered how they were getting along, but without much hope. There was nothing left for me at the party, and I doubted anything positive was coming of Andrew's heart-to-heart with Staci.

I could hear them talking as I descended the hill, but as soon as the planks squeaked under my foot they both fell silent, and watched me approach with an attention that suggested my appearance was a welcome distraction. When I finally reached the platform, they stared up at me without saying a word.

“I'm interrupting.” I turned back towards the house. “I'll leave you two alone.”

“Thanks,” Staci said.

“No, dude, stay,” Andrew insisted. Towards Staci, “Anything you say to me you can say in front of him.” I looked to Staci for permission. She shrugged her shoulders, then stood up and walked back to the house. Andrew fixed me with an exhausted look.

“Productive conversation?” I asked.

“I don't know what I was thinking.”

“I know the feeling. You ready to go home?”

Outside the ruined gate, Andrew fell asleep as soon as he sat down in the passenger seat. I threw his beer out the window, then turned his key in the ignition. I held down the brake pedal, and then popped the emergency brake. I pushed the clutch all the way back and pulled the shifter into drive. I gave it just a little gas, and eased slowly off the clutch until we were moving back down the road, towards home.

The Rules

The promise of physics, at least the promise implied when you begin, is that after long and meticulous study, you will never again be bewildered by the physical world. You won't gain any control over it (that's an engineer's job), but you'll be better able to anticipate it. Then tides, rainbows, lightning, auroras, sunsets - things once attributed to the caprice of eccentric gods - would become casual inevitabilities, and you will rest assured in the knowledge that whatever happens, it will happen according to knowable, immutable rules.

That the things of this world tumble, collide, spin, coalesce, and dissipate all according to the same rules could be called the first pretense of physics. It is, however, far from self-evident. It is not among the intuitive, spiritual truths like "all men are created equal" that require no explanation or evidence. In fact, it takes a continuous succession of devoted teachers twenty-odd years just to expose the grossest, most inconsistent "laws" to a student. And at any given time, there are a multitude of observations and experimental results which seem to exist outside or else bluntly contradict the rules as we know them.

Such inconvenient facts can be interpreted either of two ways: the laws of nature are really just rules of thumb and actually allow for a certain degree of whimsy in the determination of reality, or our understanding of the rules could require refinement. A physicist will in every case choose the latter, no matter how drastic a "refinement" is entailed.

So we weave whole tapestries around every loose thread, because, the argument goes, if the piece was truly complete there could be no loose ends. This is curious, because that's exactly the kind of circular reasoning that scientists are trained to detect in its subtlest forms and reject outright in most other circumstances. Nevertheless, it is, I think, the very last premise we would abandon if, one by one, all our conclusions were proven to be contradictory and false.

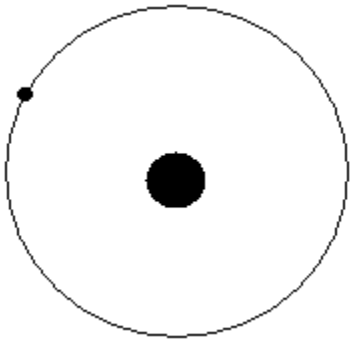
Imagine watching a rugby match for the first time, with no preconception of the game or its rules. It would be easy to conclude from the chaos on the field that the players were just being violent, and had been confined to the pitch some time ago in the interest of public safety. It would even be easy to draw the further conclusion that there were no organizing principles, in fact no principles whatsoever, governing their behavior.

Even if you kept watching long enough to notice patterns, even if you could eventually tell who was winning and predict when they scrum (you might have chosen to call it a "circular shoving event"), even if you somehow reconciled your understanding of civilized competition to the fact that nobody stops the game for even a moment when every single player is bleeding, what would you think when, during a line-out, each team grabs a man by the shorts and literally wedgies him into the air? If you didn't know beforehand, for absolutely certain, that rugby really did have rules, how could you straightfacedly say that such a thing could be allowed by any sensible, self-consistent conventions of gameplay? It would require rationalizations and contortions of reason which simply strain belief. It would require, in essence, a leap of faith.

Scientists are, either by training or simple predisposition, a skeptical bunch. Any leap of faith sits uneasily with us. But everyone's got to start somewhere. The most logically perfect deduction begins with "if," and if everything happens according to universal rules, and if these rules never change, the rest can be found out by reason, supposition, trial, and error. Then we need leave nothing else to assumption, and that's as good as it gets for a reasonable skeptic.

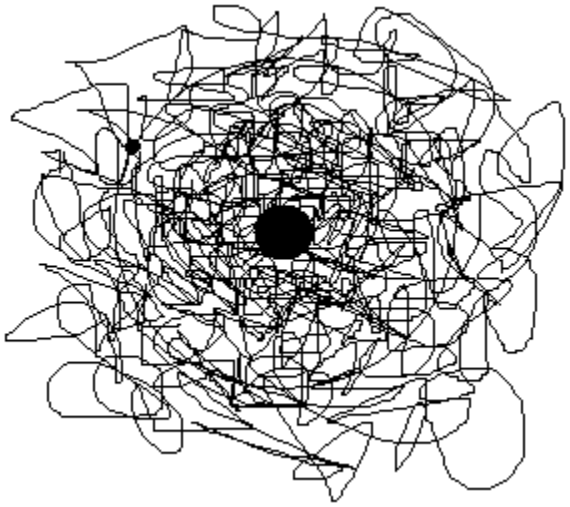
When I sat down to my first Quantum Mechanics lecture, I had already learned a lot. In fact, I was beginning to feel somewhat secure in my knowledge and talents. I knew why an arrow flies straighter than a rock. I knew how to reason with the stubborn mule and why the clever monkey gets shot. If you told me that a stiletto heel exerts more pressure on the ground than the Eiffel Tower, I would have replied as though there was nothing more obvious. I had learned why the sky is blue and why it changes color just before daybreak and nightfall. I could explain why you are safe in your car in a lightning storm. I knew how tides work, what causes rainbows, and why auroras are usually only seen at extreme latitudes. I thought I could solve some pretty diabolical mathematical puzzles. Everywhere I looked in my day-to-day life, I saw the simple, intuitive rules behind complicated things, and this reassured me.

Our professor said that we would begin Quantum by considering the hydrogen atom. This pleased me. I like Hydrogen. It is the simplest practical problem in atomic physics - one proton in the nucleus, one electron. Prior to quantum, science teachers had drawn it like this:



The very picture of scientific beauty. Simple, symmetric concentric circles - it even resembles a planet orbiting a star, suggesting that the smallest constituents of our universe move in much the same way as the very largest. We had encountered physically and mathematically analogous systems in Kinematics, Electrostatics, and Astronomy. It looked like familiar territory.

In that first Quantum lecture the professor revised this diagram to the following:



Then he explained that the hydrogen atom is less like a little planet orbiting an itty-bitty sun, than a diffuse, three-dimensional harmonic probability distribution extending to infinity. Furthermore, the electron doesn't actually exist in one spot. Until you look at it. Then it collapses into one of several discreet states, which can't be precisely predicted no matter how exact your initial values are.

When I went to another professor for clarification on this last point (it seemed as good a place as any to start), he explained it like this: If you want to find out whether your girlfriend loves you, you might ask her to marry you, assuming that if she loves you, she'll say "yes," and if she loves you not, she'll say "no." Even if she's not really certain whether she loves you, she has to accept or reject a wedding proposal, and what's more, simply asking changes the relative likelihood of either outcome, because proposing is a very romantic gesture.

That was his *clarification*. An electron is like a woman in love. Suddenly the world was a frightening, arbitrary place again.

Students adopted a variety of coping mechanisms. Some retreated into a shellshocked, zombie-like state of mind where the only way to deal with getting your mind blown before breakfast every morning was to just do the math, plug and chug, calculate first, ask questions later. If the professor told one of these students that the number of angels dancing on the head of a pin was an observable of the time-varying Schrödinger wave equation, he or she would nod thoughtfully and then ask what the corresponding linear operator was, and how to compute its expectation value. I made it

through a lot of homework like this. Others met the new quantum regime with open intellectual revolt. The two guys sitting next to me in the first exam insisted that although they needed a quantum class on their transcript in order to graduate, they didn't believe a word of it. “Curve-fitting,” they spat in unison, and proceeded (I can only assume) to perform exactly as well on the exam as was absolutely required to pass.

For my part, I knew the experimental evidence was too good to write it all off as a curve-fit. Last I read, Quantum Electrodynamics could predict the results of completely novel experiments to fifteen significant digits. You just don't get that precision with a good approximation. That takes an accurate (nigh exact) model, and QED was a direct extension of the ideas we were being tested on.

When people ask me at parties what draws a cat as cool as myself to the comparatively un-hip field of modern physics, I tell them that word hasn't gotten around yet, but ever since I jumped on the bandwagon, physics is the place to be. Then I usually have the rest of the night to consider a sincere answer in solitude.

A good half of the truth is that I'm probably not fit for anything else. Quantum Mechanics and Partial Differential Equations don't come easy to anybody, but for some of us, they inspire substantially less anxiety than the thought of getting by on people skills and business savvy. And no matter what else I might do with myself, I would never achieve my potential, because I would always be distracted by trying to find out why trivial things work the way do. Even as I'm writing this, I'm spinning peanut M&M's on my desk, watching them precess until they stand up on their long axis, and wondering if regular M&Ms, which unlike peanut, are symmetric about every transverse axis of

rotation when they're lying flat, would do the same. If not, it would prove that peanut M&M's are superior to regular not only in flavor and nutrition, but also in their quantitative mechanical properties. Unfortunately, I think they would, and now I'm going to take time out of my day to buy candy I don't actually like just to see if I'm right.

The other half of the explanation lies in the fact that I find things like M&M's wobbling on a desk and bubbles in fizzy drinks to be profoundly beautiful. The peculiar beauty of physics is a very abstract thing, and hence difficult to describe. The word most often used to evoke the sentimental quality of a great proof or experiment is "elegance," though here as everyplace else, physics is frustrated by the limitations of language. Evening gowns and figure skaters are "elegant." Theorems and derivations are something else, but "elegant" comes close.

Whenever I'm drawing breath to explain this to somebody, though, I think of the time at the aquarium when I saw a marine biologist call an eleven-foot Beluga Sturgeon, which was plainly to see the most hideous animal ever to disfigure the complexion of nature, a "beauty." I don't know if all sturgeon are that frightening. In fact, I think I would sleep better at night if I were to learn that this particular sturgeon was congenitally deformed and had been maimed by a shark. Regardless, he was looking at the same fish I was. He probably knew, however, that this family of Sturgeon existed concurrently with dinosaurs 200 million years ago, and individual Belugas can live more than 100 years. An eleven-footer is enormous for that species, so the one at the aquarium was probably quite old. That doesn't impress me. All I will ever see in a Beluga Sturgeon is a slimy, bottom-feeding nightmare made flesh. An evolutionary biologist, on the other hand, might see his venerated elder, in every literal and biological sense.

My point is that if you study something weird for long enough, you will inevitably acquire a taste for whatever is peculiarly beautiful about your subject. Ask anybody who knows an entomologist.

That peculiar beauty was what seemed to be missing from Quantum mechanics, and the longer I spent with these bizarre new concepts, the less apparent it became that I would ever find it again. Nostalgia for Mechanics and Electrodynamics, and even Relativity, crept up on me throughout the term.

I suppose the high point came near the end of classical electrodynamics, when we finally wrote down the complete Maxwell Equations. We'd made it through calculus, mechanics, relativity, vector analysis, and partial differential equations to get there, and all at once there was no doubt that it had been worth every proof. It was so excruciatingly simple, too:

$$\nabla \cdot \mathbf{D} = \rho_f$$

$$\nabla \cdot \mathbf{B} = 0$$

$$\nabla \times \mathbf{E} = -\frac{\partial \mathbf{B}}{\partial t}$$

$$\nabla \times \mathbf{H} = \mathbf{J}_f + \frac{\partial \mathbf{D}}{\partial t}$$

That may or may not mean much to you, but briefly - ever so briefly - I thought it was everything. Except for gravity, it was all there. Four simple rules explaining everything I knew how to ask about magnetism, electricity, and light. Not only do they tell you all this, they reveal that it's all the same thing! With a little math, you can even reduce the list to two equations. All that information in two lines. It was (and is) a marvel

of concision. Dozens of theorems, formulae, equations, rules-of-thumb, and empirical laws, with many times more variables, constants, and functions, expressed in a form you can memorize in ten minutes and write in twenty seconds. It was as though we had decrypted the world, and this was the simple note written in code.

Such a profound sense of accomplishment was, of course, naive. In the last week of E&M, Professor Trivedi posed several rhetorical questions that demonstrated how little we actually understood: Why doesn't the nucleus of an atom explode under the massive forces of electrostatic repulsion created by so many like-charged protons packed so tightly? Why doesn't an electron radiate away the energy that keeps its orbit stable and spiral into the nucleus? And what about the photoelectric effect? These were all phenomena for which we could not account, knowing only what we did at the time. The explanations would lie in Quantum mechanics, she told us, and sent us on our way for the summer, with only a vague inkling of what we were in for come autumn.

After my first Quantum final, I flew to Switzerland to spend Christmas with my family. Before leaving our apartment for the airport, I said goodbye to my girlfriend-roommate, Fran.

"No kissing any little French Heidis while I'm waiting for you to come home."

"Swiss. And men do it, too. There's no reason to be jealous. It's just how they say hello."

"You want to find out how I say *au revoir*, mister?"

I passed most of the flight with my textbooks, hoping that “the big picture” would resolve itself as soon as I wasn't worrying about the next homework deadline. Ten hours after takeoff, I felt just as lost in Geneva as I had in Ohio.

We landed a stone's throw from CERN, the international super-laboratory where many of the most spectacular experiments in quantum physics are performed. An aerial photograph of their eighteen-mile synchrotron ring covered an entire wall in the baggage claim, and advertised that it was only a short bus ride from the city. “I'll have to visit,” I thought, as I collected my enormous orange duffel, stuffed full of American merchandise I had no intention of declaring. The scientific achievements of CERN are among the wonders of this world, but I wasn't about to subsidize their research through the extortionate Swiss import tax. Perhaps someday I'd make my way back as a scientist, instead of a poor tourist, and they'll call it even.

My first night in Geneva, I was wide awake with jet-lag at 3AM, catching up with my father and sharing a bottle of very old whiskey. Mom and my brother Ryan were both asleep. We sat in the dining room of their apartment, overlooking the Parc de Bastions.

Like any article of faith, one can come around to "The Rules" by conversion, epiphany, political convenience - any number of ways. I was raised in the belief by my father - a scientist, engineer, and teacher. As a kid, quality time was science lessons in the car on the way to school, and extemporaneous math lectures on a large whiteboard he kept next to the fishtank. He taught me all the basic ideas and tools, but most importantly, he taught me to appreciate the peculiar beauty that all these things possessed. He taught me to love the staggering progression of mathematical formalism and inspired

supposition that advances our understanding, one after the other, like a limping gait towards a compelling but unknown destination.

It was therefore natural that I would eventually bring my misgivings about what I had been learning to him. Do the oddly-shaped pieces we're being given ever fall into place? Will I ever see anything as beautiful as Maxwell's Equations again?

“No,” he assured me, “that never happens again.”

I didn't visit CERN on that trip, and I didn't study another page of Quantum Mechanics. Instead I played chess in the park by the Wall of the Reformers, a thirty-foot granite perp walk of important and dour-faced Protestants. I did my Christmas shopping in Rive, played Ryan's video games, and re-read The Hitchhiker's Guide to the Galaxy for the umpteenth time. I spent whole days without even thinking about physics.

Then I would find myself in a pub in Old Town, watching Rugby with Ryan in sozzeled stupefaction, and it was all around me. Beer bubbles, darts, neon lights, cigarette smoke - how could I think of anything else? I remembered CERN, and realized that a lot of serious thinking about physics must go on in Genovese pubs. Why not, then?

My problem, I thought, as I shambled back to the bar for my fourth pint, was that the tentative grasp I thought I had obtained on the world around me seemed to be slipping. Casual inevitabilities were losing ground to impossible contradictions. Bewilderment was creeping back in around the edges.

“Qu'est-ce que vous voudrez?” I pulled a mechanical pencil from my shirt pocket and tapped the far-right tap. I had adopted a superstition, totally inaccurate, but at least definitive in moments of indecision, that when I couldn’t recognize the beers on tap or speak fluently enough to ask, the dark beers were on the right.

"Oui, Monsieur. Neuf franc." I estimated the cost of my beer in US dollars, doubled the figure as a fairly reliable conversion to Swiss Francs, accounting for the cost-of-living premiums in Geneva, and set the next bill bigger than that on the bar.

While the bartender poured my draught, I dragged my focus heavily around the pub: past Ryan's friends carrying on in three languages, none of which I spoke, past the bigscreen projecting an inscrutable game to a rowdy audience in the corner, past the street outside that I couldn't find on a map if you put a gun to my head, past the unfamiliar lakeshore skyline (when did they turn off the Jet?), past a tourist couple scratching their heads at a drinks menu, over a new pile of change I had no reliable way to count, and finally to my fresh-pulled stout. The bubbles were sinking. I had no explanation. I thought back to the pretty blonde swarm of hadrons waiting for me at home in Ohio, who perplexed me often, yet with whom I found myself increasingly entangled.

It was futile to avoid bewilderment, I decided, and equally foolish to resent it. After all, sometimes we travel a long way to renew our sense of bewilderment, to remind ourselves that our savvy is localized, our eloquence limited to one tongue among many, our sophistication only regional. We live in a complex, astonishing world. Wonder is entropic. We can diminish it somewhat within our limited horizons, at cost of considerable effort, but there is always more, ever encroaching. Those who forget are prone to foolish declarations and impossible ambition. Better to let it in. Learn to swim rather than spend your strength holding a leaky dam.

After last call, Ryan and I stumbled home through the *parc*, past the abandoned chessboards. I was overjoyed to see that the evening's games had all ended in checkmate. Ryan ducked behind a dark stand of trees to relieve himself in front of Calvin and Luther.

Back at the apartment, in bed with my laptop, I Googled “stout bubbles” and read until sunrise.

The following summer, I checked out a book from CERN’s User Library, during a break in my shift babysitting an experiment at the Proton Synchrotron. It was a biography of James Clerk Maxwell, with reproductions of his seminal papers. My break was limited, so I skipped directly to “A dynamical theory of the electromagnetic field (1863),” expecting to find the first publication of my favorite equations. I skimmed the paper for the boldface E’s, B’s, D’s, and H’s, the inverted triangles or the elongated, calligraphic S’s that I had committed to memory. They were nowhere to be seen. Instead I found several dozen pages of dense, nineteenth-century technical verbiage which beat around and around and around the mathematical bush, without ever achieving what every modern reader knows in hindsight to be the center of the matter. It was less than elegant. Indeed it was obtuse, even nearsighted, and worst of all – verbose.

The content was all there. If you took the time to parse and formalize Maxwell’s jargon symbolically, it is possible to extrapolate the equations as we know them today. Oliver Heaviside would be the first to do so in 1881, but the astounding fact remained that at first and for a number of years, Maxwell’s equations, the standard by which I had learned to judge all scientific elegance, were cumbersome and ugly.

I shelved the book, checked my watch and dosimeter, and started back for the radiation lab.

I suppose that as a student, it's easy to forget that it's all a work in progress. As long as you're running flat out just to catch up with the pack, it won't occur to you that

nobody knows where the finish line is. If there seem to be a few too many loose or unsightly ends, we may just be awaiting the next clever supposition which will fold our flat, ragged tapestry into new dimensions, where rough edges describe the seams of a simple new shape. It won't be Law's Laws – I'm no Maxwell or Heaviside – and it probably won't be accomplished in my lifetime. As always, it could be the loose end which is never tied up. The possibility that it someday might, however, is enough to rededicate a weary student to his work, and allow him to continue exactly as he began – with a small leap of faith.

The Great American Shaving Essay

If you are ever tempted to doubt the degree to which young people today are raised by their computer screens, consider this: the internet taught me to shave. My parents were by no means negligent on this point. Like every other young man of recent generations, I was supplied with a stack of disposable razors and a can of pressurized foam as soon as my nascent thirteen-year-old scroa-tee grew too unsightly. Of the razors themselves, it has of course been easy to forget the details: blue or green Gillette or Schick two- or three-blade plastic disposables with or without a green or white lubrication strip and a head that tilted on little plastic dowels from Long's or CVS or Walgreen's or Eckerd or Giant Eagle or wherever. The essence of cheap, consumable, disposable, commodity.

The foam, a can of Aveeno sensitive-skin shave cream, was slightly more particular. My father's face is prone to painful razor burn, and he insisted, out of concern that the affliction could be hereditary, that I learn to shave with the gentlest, most protective, soothing top-shelf cream available, price be damned.

I was left to experiment with these novel tools in the bathroom alone, my parents confident that the whole apparatus was self-explanatory, and virtually harmless. I took to it with little blood or thought or effort, exactly as expected. Bloodless, thoughtless, effortless. No problems here. If it ain't broke, don't fix it. From thirteen through high school and college, my shaving routine varied only in frequency. Whenever I got busy, or tired, or just plain lazy, I knew I could always sneak a sixty-second shave at the last minute, if needed.

The next time I gave more than a passing thought to the utility or economy of shaving razors was ten years later, visiting my parents on vacation. My father had found the answer to his chronic razor burn, he insisted, and he was hell-bent on evangelizing his discovery. The magic wand was a "Gillette Fusion (Power)" razor: not two, not three, but *five* blades, mounted in a disposable cartridge head which, get this, *vibrates*. You press a button in the handle, and a small battery-operated motor transmits a muffled decahertz buzz to the blades. Ostensibly, this adds tiny chopping and sawing motions which help to overcome friction and microscopic snags during the usual slow, planing strokes. After Ryan and I had unpacked for the holiday, Dad summoned us both to the bathroom. Therein he handed two pristine Fusion (Power) razors, blister-packaged with five blade cartridges (about a month's worth) and one Duracell AA battery each, to my brother and I, like the Bhagavad-Gita.

Allow me to preface all of the following by insisting that I am no Luddite. I am perfectly cozy with technology. At my day job, which I love, I test prototype particle detectors for experiments in superconducting atom-smashers. I believe fervently in progress and the potential of new tools to improve our lives.

This was not progress. This was the mutant fallout-spawn of an absurd marketing arms race gone thermonuclear. The only technological achievements in the development of this product were found not in the razor itself but in the associated marketing blitz – primarily in the closely-knit fields of computer-generated 3D stubble simulation, and male electrolysis.

In all fairness to my father and the hardworking industrial engineers at the Gillette Corporation, the vibrating blade head did seem to accomplish a noticeably smoother shave, and with less irritation, compared to my cheap disposables. That wasn't the point. The point was that this platypus, this hermaphrodite, this expensive, wasteful answer to a question nobody asked, was an abomination. Perhaps it was my recent first experience of Walden, perhaps my growing technological acumen, but this shiny little too-clever widget massaged my cheeks the wrong way. Somewhere, a line had been crossed. Where? Was it electronics? Modular blade cartridges? Electronics? Five blades? Four?

Allow me to warn you now: second-guessing the necessity of common consumer goods is a slippery slope. The Gillette Fusion razor appeared on pharmacy shelves in 2006, less than a year after the Gillette Corporation was purchased by Procter & Gamble, which also happens to sell Duracell batteries. One mystery solved. Looking back a little further, the ad-hoc addition of a battery-intensive motor was really only an uninspired derivative of the safety razor's original, essential concept. The first disposable-blade razor was marketed by King Camp Gillette in 1902. His patent – one of the most lucrative in the history of intellectual property – was *not* for the ergonomic handle or the "safe" shrouded-blade geometry, both of which had existed for over one hundred years. It was for an adjustable clamp in the head that opened and closed to swap cheap blades, which were expected to rust and blunt with a few uses, requiring frequent replacement. Gillette himself averred that in developing patent #775134, his sales concept, now known as the "leading-loss" or "razor-and-blades" model, preceded every particular detail of the eventual product.

Gillette was a canny promoter, as well. The nomenclature “Safety Razors” was a deliberate slander against the conventional straight razor, a reliable tool which had persisted in common use for literally thousands of years, with no dire effects on the population statistics. The obvious alternatives, “Convenience Razors” and “Garbage Razors,” just didn’t stand up to the old “I don’t know about the competition, but *my* product won’t kill you” pitch.

cui bono. Never assume it’s there because you need it. If it makes somebody rich, that’s why it’s there.

The following Christmas, I showed my father *my* new razor. It was a 5/8 full-hollow ground, carbon steel, round-point straight razor forged in Solingen, Germany, with imitation mother-of-pearl scales and a black rubber spacer. The brand, "Colonel Ichabod Conk," is carelessly etched off-center on the tang. It is a high-quality blade with downright cheap adornments. My fiancée Fran bought it as a Christmas present, from a Craigslist contact at the RockRidge BART station in Oakland, California. The sight of the razor caused my father a moment of visible consternation, which I came to understand a few days later on Christmas morning, when I unwrapped yet another straight razor. This one was a DOVO "Bismarck" - 6/8 full-hollow carbon, also made in Solingen, but with a more aggressive toe, a shoulderless tang, and its brand mark in gold leaf on the inner curve of the concave grind. My parents had bought it from an expensive storefront in downtown London called "Taylor of Old Bond Street." I still have both, but I love the Conk best.

Fran and my parents all had the same notion, because it was common knowledge among my close family that I had spent several months haunting the message

boards on www.StraightRazorPlace.com, and I was growing anxious to put my research to practical use. Among many other more practical details of grip, lather, and honing, I discovered on SRP that using a straight razor seems to improve your vocabulary. And I don't just mean it makes it *bigger* with great words like "jimps," "faceturbation," and "hamon," and fun new senses of "shank," "shoulder," "scale," and "weeper." It makes the vocabulary you've already got better. Straight razors have left a persistent legacy in our vernacular, even if we've left the razors themselves largely behind – a legacy which has grown pale without its original antecedent objects. You start to understand "razor-thin," while trying, unsuccessfully, to focus your eyes on the edge in profile, only to find that no matter how close you get, the bevel just disappears into itself, like railroad tracks tapering to the horizon. You see for yourself how small a difference you take when you split a hair. You might read it or say it, but you'll never appreciate "razor-sharp" until you nick yourself and count a full forty before you bleed.

At first, Fran was terrified of the razors. She wouldn't stand in the same room, at any distance, while I was shaving. She was certain that one or both of us would end up maimed before I got the hang of it. She bought me the razor, because it was what I wanted, but she could not fathom what she saw as the needless urge to take my life in my hands, just to accomplish a simple task that could be much, much simpler.

Of course, it wasn't for danger or some sort of cheap thrill. It was for the economy, the ecology, the ritual, the meditation. It was to add some challenge and just a little bit of damn culture to a thoroughly drudgerous chore. But for that matter, why *should* it be so rare and harrowing an experience to take one's life in your own hands?

Where else would you have it? A padded box? A low shelf? Better to know it with your fingertips and palms, to feel its dimension and learn its balance. It may be that it is not so delicate or precarious a thing as we often fear.

In point of fact, it would be difficult to hurt oneself very badly with a straight razor, presuming you are not stupid, drunk, or self-destructive. Now that we have an effective and easily available vaccine for tetanus, a novice would have to make two very clumsy mistakes simultaneously - excessive pressure and transverse motion - to do anything more than nick the chin. Fran's confidence, at least, has grown to the point where she no longer hesitates to lay a stinging, full-palmed smack on my ass on her way past in the bathroom, indifferent to whether or not I happen to have one of my razors laid to my cheek. She has even begun to conduct timid experiments around her own ankles, working slowly up her shins and calves, as she works up her courage.

Since the advent of the safety razor (and the bikini), women in the western world have accumulated an impressive body of folk wisdom regarding how to shave oneself eel-smooth, with a minimum of discomfort or visible irritation. For a community of men attempting to reconstruct effectively lost knowledge, often abrading their faces raw in the effort, this has proved a valuable resource. “Mama Bear,” the elder stateswoman of lotions and soap on Straight Razor place, does as brisk a business in practical advice as in bottles and cakes. As with all other supposedly manly arts, women began to make considerable contributions, as soon as we lowered the rope to the treehouse.

Regrettably, straight razor shaving also seems to attract the sort of absurd machismo typically associated with bodybuilding and urban pickup trucks. An invitation to "Show us your AR!" in the off-topic forum on Straight Razor Place generated a gallery

of dozens of carefully composed and romantically lit photographs of weapons and ammunition which I very much hope are illegal. For every Thoreau, there seem to be three Clint Eastwoods. These guys want everybody to know that when they wake up in the morning, they like to pick up a really sharp knife and dance with the devil before their wheaties. To this purpose, some publish movies of themselves shaving bare-chested on the internet, set to thrashing death-metal music, oblivious to the obvious fact that if they shaved the way Megadeth plays, they wouldn't survive to the end of "Symphony of Destruction."

The cognitive dissonance of tough-guy shaving movies illustrates one of the most interesting paradoxes of shaving with a straight-edge in the twenty-first century. The razor is sharp, dangerous, and beard-related, therefore masculine, and yet lavishing a half-hour's undivided attention upon one's complexion invites accusations of dandyism. And as thoroughly as our great-grandparents' artifacts confound our categories, the uses the current generation puts them to would be equally challenging to our elders. A quick survey of threads in the "Ladies' Corner" of Straight Razor Place leaves *absolutely* no doubt as to which is indeed the more fearless sex.

The razor itself is a fragile, not a rugged thing. By the first time you pick it up after yesterday's shave, it has already fallen helplessly into abominable disrepair. Its ductile, microscopic fin has sagged over under the oppression of its own miniscule weight. Its precise, geometrical taper has begun to soften and bulge in the scant warmth of an unheated Midwestern bathroom. Whatever moisture happens to be suspended in the air has laid patient, infectious siege to the susceptible iron atoms at the razor's surface. They can't penetrate deep - the airtight crust of oxide is self-limiting - but the all-

important edge is effectively all surface. All this, in addition to the violence perpetrated against the delicate edge in the act of shaving, itself. If you tried to shave with no further preparation, the uneven edge would catch and tear at the whiskers. If you were stubborn about it, you might pluck as many as you cut. It is too blunt to shave, and too delicate to whittle or chop. Chances are, it is still the sharpest, and at the same time the most useless knife for miles around. It is a rough prototype of a highly specialized device, unsuitable for any practical purpose.

In this condition, your razor proffers the opportunity for primeval, creative labor. You can fashion a fine tool anew, from a useless piece of rough-cut steel, every day. There is, of course, an art, deliciously arcane, to teasing the razor back into shape. The determination of the readiness of your blade is an art in itself. There's the thumbnail test, the hanging hair test, the thumbpad test, and more. One of my favorites is the "leaf" test. A properly keened blade should bisect a freefalling hair with just a soft lift of the wrist, like a conductor requesting the first note of an adagio. If the hair is dry, you might hear a gentle, ringing pluck, one muted staccato note. If the hair is wet, you should hear nothing at all.

When the blade is tuned, and your beard is warm and soft, whiskers seem to dissolve into the lather as the edge just glides over. The razor sweeps them aside like a squeegee blade on a dirty window. Of course, it's not always just so. Like any delicate work with delicate tools, a straight razor shave can be beset by gremlins – warping along the edge, microscopic chips, even a folded fin from one bad stroke on the strop.

Those of us with a shaving ritual susceptible to technical difficulties learn quickly that the world at large generally tolerates the varieties of straight-razor shave in the following, decreasing order:

0) The BBS - "Baby Butt Smooth." Women admire your attention to appearances. Men wonder what you know that they don't.

1) The Sixty-Grit - obviously didn't shave. Everybody's been there.

2) The Scream - blood spots and visibly painful razor burn. Tells people that you have yet to graduate fully from adolescence.

3) The Harlequin - aborted partway through. Most people can't imagine why this would happen, unless you're being intentionally weird.

As we can see, if you commit to the first stroke, despite a grabby edge, a dry lather, or a distracted mood, the strong incentive is to see your ill-begun shave through to the bitter end. It is therefore imperative to take careful stock of your tools - and of yourself - before committing to that first stroke. I've found that the moment before I raise the blade to my face (I tend the difficult grain under my nose first, while the blade is sharpest) is a healthy occasion for a quick mental self-diagnostic. Am I steady? Am I focused? Am I patient? Do I want to live? If the answer to any of these questions is no, I've found it is the better part of valor to put the razor down and go about my business scruffily. A coworker, watching me do some surgically delicate tweezers work under a microscope, once asked wryly, “How's your shave?”

In this manner my scratchy stubble has become a persistent reminder - audible, tactile, visible - of exactly how long it's been since I've found half an hour of solitude and genuine tranquility. I have a scientist's faith in models, and in the essential unity of all

things. I believe that each of our relationships, even the most prosaic and utilitarian, is in some small way a prototype of every other. There is danger in practicing haste, inattention, and disregard, even briefly, every day. Everything comes easier with practice. I cherish the opportunity to practice patience, care, and attention for a little while, a few days a week. It's a nice feeling when you can come by it, and comfortable to get used to, in the way that wholesome things tend to be, but troubling that it should be necessary to hold oneself hostage with a knife to your throat, for life to slow down, even so much, for just a little while.

San Francisco City Hall, 3 October 2008

In a small, crowded office inside, the bureaucrats are checking appointments, confirming identification, and serving paperwork on clipboards with an enthusiasm which I have never seen before or since in a deskbound civil servant. We're lucky to be here. These have been the hottest tickets in California for months. Fran pounced on a rare vacancy which appeared after a last-minute cancellation - a story in itself which we will never know. We conclude our happy formalities and step into the waiting area in the hallway outside.

Andrew takes a silly photograph. Fran grimacing with our paperwork - blonde and pale celeste eyes behind our black-on-cream documents.

Fran is flattering a stylish monochrome. I've come comfortable in khaki and dun. By our usual standards, Fran and I are turned out, but in this bright crowd, we feel conspicuously drab. We queue behind two men in matched azure suits and make conversation. They're from Texas, and they've been standing at the back of this line for thirty years. I've never felt so young. When their number comes up, they smile and wish us luck. It feels like a benediction.

“They were sooo sweet!” Fran coos. Nice enough, I think - but which one was “Party A?”

Andrew takes a sneaky photograph - my toes curled into anxious hairy fists. I won't see the picture or realize what my feet were up to for hours.

A smiling bearded muppet, four feet tall and change in black robes, invites us from line and up to the landing of a grand staircase, beneath the hall's immense dome.

Paintings in Lascaux, and other early-human illustrations, are curiosities artistically, in that certain colors are missing altogether. Much of the world can be drawn well enough in the common hues to be found abundantly within arm's reach of the ground - dirt, blood, foliage, clay - but no matter how true-to-life the oxen, or what improvements of outline and perspective are in evidence, charcoal rivers and limestone skies make these images incomplete - primitive. It would require a little bit of additional culture to recognize the occult ingredients - cobalts and copper salts - that would distinguish the first recognizably complete landscapes.

Looking about from the landing at the robes, suits, and gowns scattered throughout the hall, I get the feeling of standing in a great polished-marble cave, in which the missing pigments had just been discovered. Andrew, Fran and I are here more or less by chance, but others have traveled considerable distance, with mo meager urgency, to paint their scene, to make their mark, to sign their names in the selfsame color of their lives, before the inkwell runs dry.

I wonder - not aloud - if perhaps we should have delayed. Fran and I would doubtless be able to make another appointment next month. Others might not. In the end, I doubt anyone would hold it against us. These things don't wait. That's the whole point, really. And even if the first, experimental tincture of indigo is quickly exhausted, it can’t be erased or soon forgotten - breathtaking and indelible as Maya Blue.

Andrew takes a perfect photograph - a portrait of young lovers in conventional hues, against a background painted in full palette. My own lovely bride's eyes have never looked so blue.